Self-Care Practice among Diabetic Patients Type (II) and Its Determinants in Outpatient Clinics

Nagah Abd El-Fattah Mohamed Aly (1), Elham Abd El Kader(2) , Hanaa Abbass Ahmed Mohamed (3), Wael M. Lotfy)4)

(1) Department of Nursing Administration, Faculty of Nursing, Matrouh University, Egypt
(2) Psychiatric Nursing and Mental Health, Faculty of Nursing, Alexandria University, Egypt
(3) Department of Medical-Surgical Nursing, Faculty of Nursing, Matrouh University, Egypt
(4) Department of Community Health Nursing, Faculty of Nursing, Matrouh University, Egypt

Abstract

Background: Diabetes is a serious health problem. Patients must be actively involved in their care. Self-care management means actions or activities taken by patients to care themselves within their environmental condition. **This study aimed to** identify self-care practice among diabetic patients type (II) and its determinants. **Subjects and Method: Study design:** Descriptive correlational study.   **Setting**: Diabetic outpatient clinics of the Main Alexandria University Hospital. **Subjects:** A convenient sample consisted of 250 diabetic patients type (II). **Tools of data collection:** Knowledge and practice questionnaires about self-care management were used to collect our data. **Results:** The current study proved that most diabetic patients type (II) ($\geq$ 90 %) had unsatisfactory levels of knowledge and practice regarding diabetic self-care management. A statistically significant difference was shown in patients' age, educational level, ethnicity, diabetes duration, diabetes status regarding their knowledge and practice of diabetic self-care management. Patients' age, sex, level of education, ethnicity, diabetes duration, diabetes status and knowledge were predictor factors of insufficient self-care practice among diabetic patients type (II). Additionally, the present study revealed that there was a positive significant relationship between patients' knowledge and their practice regarding diabetic self-care. **Conclusion:** Patients' age, sex, education level, ethnicity, diabetes duration, diabetes status and knowledge level were contributing factors affecting the level of self-care practice among diabetic patients type (II) in the present study. Increasing the level of knowledge would lead to good self-care and good diabetic self-care practice among diabetic patients type (II). **Recommendations:** Close the gap of knowledge and practice among diabetic patients type (II) is needed. Nurses should provide proper health education to their patients for enhancing their knowledge and practice about diabetic self-care management.

Introduction

A class of metabolic diseases known as diabetes mellitus is characterized by hyperglycemia brought on by a reduction in insulin production, a decrease in insulin action, or both (**Gulentie et al. 2020**). Adult-onset diabetes, sometimes referred to as type-2 diabetes mellitus, is characterized by an increase in blood glucose levels, resistance to the effects of insulin, and a reduction in insulin levels (**National Institute of Diabetes and Digestive and Kidney Diseases, 2014; Mekonnen and Hussien, 2021**). Numerous consequences are linked to it, including microvascular (retinopathy, neuropathy, and nephropathy) and macrovascular (peripheral artery disease, stroke, and coronary artery diseases) issues (**Chittooru et al., 2022**).

Due to inadequate self-care management, these issues may worsen living quality, increase disability, reduce productivity, slow down economicgrowth, shorten life expectancy, and raise the risk of morbidity and death (**Abate, 2018; Tareke & Tirfie, 2020; Gulentieet al**). One of the most important aspects of treating chronic diseases is allowing the patient to manage their own treatment. It encourages patients to actively participate in creating and overseeing their treatment plan by emphasizing knowledge and self-care abilities (**Chrvala, et al., 2016; Adarmouch et al., 2020**).

The practice of self-care is essential to diabetes control. It has a track record of success in meeting diabetes treatment

objectives. Self-care routines are crucial not only for those who already have diabetes but also for those who are at risk of developing the condition in the pre-diabetic population. It may be described as actions made by those who have diabetes or who are at risk of developing the condition to effectively manage it on their own (**Chittooru et al., 2022; Karthik, et al. 2020**).

Individuals with diabetes must follow a variety of self-care routines that are advised by the World Health Organization (WHO) (**Gulentie et al., 2020**). Diabetes patients should prioritize their nutrition, exercise, foot care, blood sugar testing, and adherence to their treatment plan (**Santulli et al. 2016; Adarmouch et al. 2020**). Following treatment instructions lowers the patient's chance of developing complications from diabetes and death, but achieving the target blood sugar level requires individuals to be highly motivated and to make constant efforts (**ALotaibi, 2020**).

A patient's knowledge about the disease and self-care practices is especially important for patients to attain the desired treatment goal and contribute significantly to the management of their disease (**Mekonnen & Hussien, 2021**). Alongside assessment of the levels of self-care behaviors, understanding their determinants is important to enable health professionals to design appropriate interventions. Factors that may affect self-management include demographic, socioeconomic, psychological, health status, and the health-care system (**Adarmouch et al. 2020; Schulman-Green et al. 2016**).

Significance of the study

Diabetes is a lifelong disease and is a major health problem worldwide with a comparative prevalence of 9.8%. The Middle East and North Africa region have the highest age-adjusted comparative prevalence of diabetes (18.1%). In Egypt,

the comparative prevalence of diabetes was estimated to be 20.9% of the population aged 20-79 years in 2021. Type-2 diabetes mellitus (T2DM) is the commonest type of diabetes (90%), and has an economic burden on patients, their families, health systems, and counties. It can lead to premature mortality, and decreased quality of life because of its short- and long-term complications (**IDF Diabetes Atlas, 2022 Reports**).

Patients with diabetes who do not practice or know enough about self-care have a higher risk of complications, which increases their morbidity and mortality. Diabetes and its complications cause a great deal of morbidity and death, which puts the health care system at risk (**Bommer et al., 2017**). The results of earlier studies conducted in Egypt and other Arabic countries confirmed that the self-care practice and its determinants were more problematic and had not received enough attention, even though diabetes self-care management practices are still important and efficient in producing significant prevention and control of diabetes (**El-Khawaga , 2015; Farahat, et al., 2016; ALotaibi, 2020**).

Aims of the study

The present work aimed to identify self-care practice and its determinants among diabetic patients type (II) through:

(1) Assessing the level of knowledge about diabetes self-care among diabetic patients type (II).
(2) Assessing the level of diabetes self-care practice among diabetic patients type (II).
(3) Assessing the relationship between patients' knowledge and practice of diabetes self-care.
(4) Identifying the determinant factors of self-care practice among diabetic patients type (II).

Operational definitions:

Operational definitions included two main terms in the current study, namely:

- *Self-care practices among diabetic patients type (II) for managing type-2 diabetes:* are actions made by patients with type-2 diabetes to effectively manage their disease by themselves.

- *Determinants of self-care practice among diabetic patients type (II):* refer to factors affecting the level of self-care practice among diabetic patients type (II), such as patients' age, marital status, education, occupation, socio-demographic conditions, ethnicity, diabetes duration and diabetes status.

Research questions:

(1) What is the level of knowledge about diabetes self-care among diabetic patients type (II)?

(2) What is the level of diabetes self-care practice among diabetic patients type (II)?

(3) Is there a relation between patients' knowledge and practice of diabetes self-care?

(4) What are the determinant factors of self-care practice among diabetic patients type (II)?

Subjects and Method

Research design:

A descriptive correlational study was utilized to accomplish objectives of the current study.

Settings:

The present study was conducted in diabetic outpatient clinics in the Main Alexandria University Hospital.

Subjects:

A convenient sample comprised 250 diabetic patients type (II) who visit outpatients during study periods. Inclusion criteria were included all patients aged equal or above 30 years.

Study tools:

Tools were developed based on literature reviews (**Asmamaw et al.,**

2015; Gautam et al., 2015; Niroomand et al., 2016; Sukkarieh & Howard, 2016; Niguse et al., 2019; Mekonnen & Hussien, 2021).

- **Toole (1): Questionnaire of socio-demographic and medical characteristics:** It was developed by researchers to collect data regarding socio-demographic and medical conditions. Socio-demographic data were related to age, marital status, education, occupation, socio-demographic conditions and ethnicity. Date of medical conditions was diabetes duration and status.

- **Toole (2): Knowledge about diabetic self-care questionnaire:** It was developed by researchers and based on literature review for assessing patient's knowledge about diabetes self-care (**Asmamaw et al., 2015; Gautam etal., 2015; Niroomand et al., 2016; Niguse et al., 2019; Mekonnen & Hussien, 2021**). It contained 11 items regarding importance and frequency of foot care, importance and frequency of eye clinic visit and physical activity. The patients' knowledge was measured using binary scale (0=No, yes =1).

Scoring system:

The maximum patients' knowledge scores were "11" and the patients achieve satisfactory level of knowledge when knowledge score was 7 points and equal or more than 60%.

- **Toole (3): Questionnaire of diabetic self-care practice:** It was developed by **Sukkarieh-Haraty & Howard. (2015)** to evaluate the self-care practice of patients. A 12-self-care practice-related question covering diet, physical activity, blood glucose testing, foot care, medication, and smoking was provided to patients. It was evaluated using three Likert scales (0= never, 1= sometimes, and 2 = always).

Scoring system:

Scoring system was developed by **Sukkarieh-Haraty & Howard (2015)**. The higher scores indicate more frequent performance of self-care activity. The maximum score was 24 points; the patients' practice was achieved satisfactory level when practice score was 15 points (≥ 60 %).

Validity and consistency reliability of tools:

Face validity was established through reviewing literature. Content validity was accomplished by 5 experts in the field of study. The expert rated their response using a 5-Likert scale (ranged from 1= applicable and 5 = inapplicable). The inter-rater reliability of the tools aimed to assess agreement among experts using content validity index (CVI). The cut point of CVI was 80%. Regarding consistency reliability, Kuder-Richardson (KR-20) test for knowledge was .95, while alpha coefficient of practice questionnaire was .85.

Pilot study and test –retest reliability:

Pilot study was implemented on 25 patients (10% of sample size). The pilot sample was excluded from the study sample. The same patients completed the same questionnaires two times (Three weeks between time 1 and 2). Test-retest-reliability was 0.82 for knowledge questionnaire and 0.89 for practice questionnaire.

Data collections:

The researchers interviewed the patients to explain the study objectives and answered any question and queries. Data were collected through direct interview by researchers. The researchers asked patients to provide their response on knowledge questionnaire using binary scale (Yes= 1 and No= 0). They also asked to rate their practice using Likert scale never= 0, sometimes= 2, and always= 3.

Ethical considerations:

Approval from the faculty of medicine administration at Alexandria University and faculty of nursing at Matrouh University to conduct the study was obtained. The patient signed on informed consent before starting the study. The patients had the right to withdraw from the study at any time. The researchers assured patients that all data were handled by confidentiality and anonymity.

Field Work

Preparatory phase

The researchers developed study tools based on literature reviews of the current and past evidence related to various aspects of patients' knowledge and practice regarding self-care management of type -2 diabetes.

Implementation phase :

The present study was conducted from Jun 2021 to October 2021. After the researchers obtained approval to conduct the current study, the researchers met each patient in outpatient clinics who agreed to participate in the current study to complete the study questionnaires. Patients took 30 minutes to complete study questionnaires.

Statistical analysis:

The data analysis was achieved using version 15 SPSS. Descriptive statistics were used to describe the study variables (percentage, mean, and standard deviations). Chi-square test was used to identify difference among study variables. The correlation test was applied to identify the relationship between patients' knowledge and practice. Logistic regression was used to identify contributing factors affecting self-care practice level.

Results

60.8% of the patients were female and 62% of them were uncontrolled diabetes. 50.8% of them had lower socioeconomic status and 59.6% of the patients had the disease for more than 5 years; they were also from rural areas. 44.8% of the patients were illiterate and 42% of them were housewives. Additionally, less than

three-quarters of patients were married (70.8%) (**Table 1**).

Most patients did not have sufficient knowledge (90.8 %) and practice (98.8%) for managing their diabetes self-care. The mean and percentage scores of patients' knowledge were 1.54 and 11.28, respectively, while the mean and percentage scores of self-care practice were 12.8 and 46.67% (**Table 2**).

Statistically significant differences regarding patients' knowledge and practice of diabetic self-care management were recorded in patients' age (p=.01 and .031, respectively), educational level (p= .002 and .012 respectively), ethnicity (p= .009 and .038, respectively), diabetes duration (p=.044 and .023, respectively) and diabetes status (p= .003 and .001, respectively) (**Tables 3 and 4**). Additionally, there was a statistically significant relation between the level of patients' knowledge and self-care practice of managing their diabetes (r=0.428) (**Table 5**).

Self-care practice was predicted by the patients' age, sex, education, ethics, and knowledge, as well as the duration and status of their diabetes, as demonstrated by logistic regression. In comparison to their counterparts, patients who were younger (≤50 years old) and female had higher practice and appropriate self-care (OR=3.34, p=0.04; OR =1.98, p= 0.02) than those aged more than 50 years old and male (**Table 6**).

Furthermore, individuals with secondary education were more likely to possess sufficient practice compared to those with primary (OR = -0.179, p = 0.008) preparatory (OR = -0.187, p = 0.002) and university (OR = 0.244, p = 0.020) education. Compared to patients in urban areas, patients in rural areas were more likely to practice poor self-care (OR= - 0.255, p=0.029). Attaining adequate self-care practices was linked to managed patients (OR =1.91, p =0.03) who had had diabetes for longer than 5 years (OR = 5.830, p =0.01). Those with higher levels of knowledge (OR=3.633, p=0.009) practiced self-care more effectively than those with lower levels of knowledge (**Table 6**).

Table (1): Personal and medical characteristics of diabetic patients type (II) (n=250).

Characteristics	No. (%)	Characteristics	No. (%)
Age		**Socioeconomic conditions**	
30-39	37 (14.8)	High	40 (16.0)
40-49	71(28.4)	Middle	83 (33.2)
50-59	99(39.6)	Low	127 (50.8)
≥ 60	43 (17.2)	**Ethnicity**	
Sex		Rural	149 (59.6)
Male	98 (39.2)	Urban	101 (40.4)
Female	152 (60.8)	**Diabetes duration**	
Marital status		≤ 5	113 (45.2)
Single	5 (2.0)	> 5	137 (54.8)
Married	177 (70.8)	**Diabetes status**	
Divorced	41 (16.4)	Controlled	95 (38.0)
Widow	27 (10.8)	Uncontrolled	155 (62.0)
Education level			
Illiterate	112 (44.8)		
Read & write	62 (24.8)		
Primary	29 (11.6)		
Preparatory	20 (8.0)		
Secondary	24 (9.6)		
University	3 (1.2)		
Occupation			
Employed / retired	42 (16.8)		
Unemployed	56 (22.4)		
Worker	47 (18.8)		
Housewife	105 (42.0)		

Table (2): Level and scores of patients' knowledge and practice in the study units.

	Patients' level (n=250)			Patients' scores	
	Satisfactory **No. (%)**	**Unsatisfactory** **No. (%)**	**Min-** **Max**	**Total** **scores** **Mean ±SD.**	**% scores** **Mean ±SD**
Diabetic self-care					
Knowledge	23(9.2)	227(90.8)	0-12	1.54±1.03	12.8±8.58
Practice	8(3.2%)	242(96.8)	0-24	11.28±1.47	46.67±6.12

Table (3): Patients' knowledge about self-care of diabetes according to personal characteristics.

	Patients' knowledge of self-care (n=250)			
Personal Characteristics	**Satisfactory** **No. (%)**	**Unsatisfactory** **No. (%)**	**χ2** **Value**	**p-value**
Age				
30-39	2 (0.8)	35 (14.0)		
40-49	7(2.4)	64 (25.6)	9.189	.01*
50-59	10(4.0)	89 (35.6)		
≥ 60	4(1.6)	39(15.6)		
Sex				
Male	10 (4.0)	88 (35.2)	.204	.651
Female	13(5.2)	139 (55.6)		
Marital status			.035	.852
Single	4(1.6)	1(0.4)		
Married	8 (3.2)	169(67.6)		
Divorced	6(2.4)	35(14.0)		
Widow	4(1.6)	23(9.2)		
Education level			9.424	.002*
Illustrate	1 (0.4)	111(44.4)		
Read & write	2(0.8)	60(24.0)		
Primary	6 (2.4)	23(9.2)		
Preparatory	5(2.0)	15(6.0)		
Secondary	8(3.2)	16(6.4)		
University	1(0.4)	2(0.8)		
Occupation			.567	.282
Employed / retired	6 (2.4)	36 (14.4)		
Unemployed	5 (2.0)	51(20.4)		
Worker	3 (1.2)	44 (17.6)		
Housewife	9 (3.6)	96(38.4)		
Socioeconomic condition				
High	12 (4.8)	28(11.2)	.866	.352
Middle	7(2.8)	76(30.4)		
Low	4 (1.6)	111(44.4)		
Ethnicity			9.32	.009*
Rural	7(2.8)	142(35.6)		
Urban	16(6.4)	85(12.8)		
Diabetic duration			6.233	0.044*
≤ 5	5(2.0)	108(43.2)		
> 5	18(7.2)	119(47.6)		
Diabetic status			11.606	0.003*
Controlled	20(5.0)	75 (30.0)		
Uncontrolled	3(1.2)	152(60.8)		

 ***Chi-square (χ²) was significant at ≤ 0.05.**

Table (4): Patients' practice about diabetic self-care according to personal characteristics.

| Personal characteristics | Patients' self-care practice (n=250) | | | |
	Satisfactory No. (%)	Unsatisfactory No. (%)	χ^2 Value	p-value
Age			4.310	.031*
30-39	0 (0.0)	37(14.8)		
40-49	2(0.8)	69(27.6)		
50-59	5(2.0)	94(37.6)		
≥ 60	1(0.4)	42(16.8)		
Sex			4.880	.027*
Male	3(1.2)	**97(38.8)**		
Female	5(2.0)	147(58.8)		
Marital status			1.005	.316
Single	**0(0.0)**	**5(2.0)**		
Married	4(1.6)	173(69.2)		
Divorced	2(0.8)	39(15.6)		
Widow	1(0.4)	26(10.4)		
Education level			8.778	.012 *
Illustrate	0	112(44.8)		
Read & write	0	62(24.8)		
Primary	2(0.8)	27(10.8)		
Preparatory	2(2.8)	18(7.2)		
Secondary	3(1.2)	21(8.4)		
University	1(0.4)	2(0.8)		
Occupation			.204	.651
Employed \ retired	2(0.8)	40(16.0)		
Unemployed	0(0.0)	56(22.4)		
Worker	1(0.4)	46(18.4)		
Housewife	4(1.6)	101(40.4)		
Socioeconomic condition				
High	5(2.0)	35(14.0)		
Middle	3(1.2)	80(32.0)	.328	.567
Low	0(0.0)	115(46.0)		
Ethnicity			4.310	.038*
Rural	1(0.4)	148(59.2)		
Urban	7(2.8)	94(37.6)		
Diabetic duration				
≤ 5	2	111	4.958	0.023*
> 5	6	131		
Diabetic status			12.595	0.001*
Controlled	7(2.8)	88(35.2)		
Uncontrolled	1(0.4)	154(61.6)		

*Chi-square (χ^2) was significant at ≤ 0.05.

Table (5): Correlation between patients' knowledge and practices regarding diabetic self-care management.

| Variables | Pearson's correlation (r) | |
	Knowledge Scores	Practice scores
Knowledge scores	1	.428*
Practice scores	.428*	1

* Sig. (P $\leq$ 0.05).

Table (6): Determinants of self-care practice among diabetic patient type (II), using logistic regression.

Variables	OR	95% CI lower- upper	p-value
		Patients' self-care practice	
Age (years) (< 50 Vs.≥ 50)	3.34	1.02-10.8	0.04*
Sex (Female vs. male)	1.98	1.34-2.94	0.02*
Marital status			
Single vs. married	0.056	− 0.147 - 0.070	0.468
Divorced vs. married	0.089	− 0.845 - 2.785	0.381
Widow vs. married	− 0.042	− 2.789 - 1.578	0.571
Education level			
Illiterate vs. Secondary	− 0.179	− 2.331 - 0.395	0.008*
Primary vs. Secondary	− 0.187	− 2.498 - 0.576	0.002*
Secondary vs. Secondary	0.244	0.034 - 0.273	0.020*
Occupation			
Employed \ retired vs. Housewife	0.80	0.62-1.53	0.45
Unemployed vs. Housewife	1.19	0.81-1.96	0.7
Worker vs. Housewife	2.43	0.97-5.78	0.35
Socioeconomic condition			
Middle vs. High	1.39	0.84-1.97	0. 5
Low vs. High	1.80	0.88-3.02	0.6
Ethnicity			
Rural vs. Urban	− 0.255	− 3.763 to 0.294	0.029*
Diabetic duration:	5.830	2.603-12.11	0.01*
Diabetic status:	1.91	1.22-3.450	0.03*
Level of knowledge	3.633	2.526-5.181	0.009*

CI: confidence interval. *Odds ratio (OR) was significant at ≤5.

Discussion

Diabetes Mellitus is a chronic illness with various side effects that requires continuing medical care and education. Strict glycemic control is the treatment goal to help diabetic's live better lives by delaying the development of problems. Patients' compliance and self-care are critical factors in appropriate management of diabetes mellitus. Self-care practices are actions made by individuals with diabetes to manage their illness by themselves effectively (**El‑Radad et al., 2022, Chittooru et al., 2022**). The objective of the current study was to identify self-care practice among diabetic patients type (II) and its determinants in outpatient clinics.

The present study revealed that most of the patients had insufficient levels of patients' knowledge and practice regarding diabetic self-care management. It was noteworthy in the present study that the percentage scores of diabetic self-care knowledge and practice among patients type (II) were 12.8 and 46.7%, respectively.

The current study was supported by studies by **Albaiuomy et al., (2019) and El‑Radad et al., (2022)** in Egypt and **ALotaibi (2020)** in Saudi Arabia who found that level of self-care management practices among patients with type-2 diabetes is not satisfactory. The results of current work were also incongruent with other studies in Addis Ababa (2014 and 2016) (**lemessa, 2014; Mamo et al., 2016**), India (2015) (**Suguna et al., 2015**), and Ethiopia (from 2017 to 2021) (**Berhe et al., 2017, Aschalew et al., 2019, Dedefo et al., 2019; Gulentie et al., 2020; Mekonnen & Hussien; 2021**), which reported that self-care knowledge

among diabetic patients type (II) was at sufficient levels.

This discrepancy between the current study and other studies may be due to the sample size, socioeconomic status, and cultural differences. The present study was carried out on 250 patients in outpatient clinics of the Alexandria main university hospital. This hospital offers free high-quality health care service to all Egyptian communities. However, other studies were conducted in public hospitals in Addis Ababa, India and Ethiopia with different sample sizes, socio-economic status, and cultural.

The present study highlighted that there was a positive and significant correlation between patients' knowledge and practice regarding self-care management of type -2 diabetes. This result was consistent with the findings of **Chittooru et al., 2022** who discovered that two-thirds of the patients in their research needed significant improvements in their self-care practices. Inadequate patient practice may be attributed to a lack of patient information regarding self-care management of diabetes type (II).

Gulentie et al. (2020) stated that the level of self-care knowledge and practice among diabetic patients type (II) was determined by predictor factors such as age, monthly income level, treatment regimen, social support, and diabetic education. Predictors of self-care management of diabetic patient type (II) may be contextual and often depend upon personal, family, and health system-related factors. As shown in the present study, the patient's age, sex, educational level, ethnicity, and knowledge, along with diabetic duration and status were the predictor factors of self-care practice.

The current results were agreed with **Mahfouz and Awadalla (2011)** who reported that the longer duration of the disease was associated with higher compliance with diabetic self-care

management. Additionally, the current findings were similar to the study in India (2022) which showed that female, unmarried, uneducated, and poor socioeconomic condition participants have a significantly greater risk for moderate to poor self-care scores (**Chittooru et al. 2022**). A similar result of current work was also found in a study of **Niguse et al. (2019)** which reported that female gender, married, and belonging to higher socioeconomic status was positively related to good exercise and glucose monitoring behaviors.

From the researchers' point of view, declining patient knowledge and practice levels from the sufficient level of self-care management of type -2 diabetes might be related to the fact that almost all of the patients in the present study were female; illiterate, belonged to a low socioeconomic circumstance and from rural areas. The present study was supported by the study of **Mahfouz and Awadalla (2011) and Chittooru et al., 2022** who found that inadequate levels of diabetic self-care management among diabetic patients type (II) may be due to a higher percentage of participants in their studies were women, illiterate, had low socioeconomic circumstances and from a rural region.

Conclusion

The present study found that patients' age, sex, level of education, ethnicity, diabetic duration, diabetic status and level of knowledge were contributing factors affecting the level of self-care practice among diabetic patients type (II). It also showed that there was a statistically significant difference in patients' age, educational level, and ethnicity regarding their knowledge and practice of diabetic self-care.

The current study revealed that there was a gap in patients' level of knowledge and their practice regarding self-care management of type-2 diabetes. The

patients in the study clinics did not achieve a satisfactory level of diabetic self-care knowledge and practice of diabetic self-care. There was a positive statistical relationship between patients' knowledge and their practice regarding diabetic self-care. The unsatisfactory patients' level of knowledge was a predictor factor of the unsatisfactory level of diabetic self-care practice in present study.

Implication for nursing practices:

Health care organization should adopt certain strategies for improving patients' knowledge and practice about diabetic self-care management through:

(1) Developing educational training programs for patients and their families to enhance patients' self-care practices.
(2) Developing educational booklet about self-care management and delivered to patients for improving their awareness about diabetic self-care management.
(3) Establishing training program for nurses working in outpatient clinics for teaching them about diabetic self-care program.
(4) Encouraging nurses to conduct regular sessions about diabetics for ensuring retaining of the patients' knowledge and good diabetes self-management skills.
(5) Encouraging patients' independence is an essential part of self-care practices.
(6) Improving self-care practices via the financial and social support.

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